



# UNITED STATES AIR FORCE RESEARCH LABORATORY

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## TOWARD A UNIFIED THEORY OF WORK: ORGANIZATIONAL SIMULATIONS AND POLICY ANALYSES

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## **TOWARD A UNIFIED THEORY OF WORK: ORGANIZATIONAL SIMULATIONS AND POLICY ANALYSES**

### **Introduction**

In a recent paper on future directions for military occupational analysis (OA), Bennett, Vaughan, and Ruck (1993) recommended a number of research and development (R&D) topics for improving current OA practice and extending OA application in military manpower, personnel and training practice. In that paper, it was observed that "to a great extent, OA technology in the DoD has been developed in response to specific applied problems and issues in MPT planning and management." As a consequence, both current OA practice in the DoD and the future OA R&D directions recommended by Bennett, Vaughan, and Ruck (1993) are not well-connected or integrated. However, in the long run, the DoD needs a truly integrated MPT planning and management system--an "ultimate person-job match system". Progress towards developing this "ultimate person-job match system," as well as synergism and focus in OA R&D and practice, requires an integrating framework. We believe that a unified theory of work is needed to provide this framework and to guide and focus OA-related R&D.

Bennett, Vaughan, and Ruck (1993) present a brief sketch for a unified theory of work. This paper will expand on that necessarily brief presentation to illustrate what a unified theory of work might be like -- including its major variables, relationships and concepts. Key issues are explored concerning such a unified theory work, focusing on how such a theory could be used to improve DoD MPT planning and OA practice. Finally, some basic R&D needs to develop, refine, and test such a theory are discussed.

### **Why A Unified Theory of Work?**

Why, from the standpoint of OA and MPT practice, do we need a unified theory of work? A brief answer to this question was given above--to support integrated MPT planning and management and to guide and focus OA-related R&D. Here, we present a more detailed answer to this question.

In general, OA data provide a detailed, accurate picture of the jobs and tasks currently a part of an occupation or organization (Christal & Weissmuller, 1988; Mitchell, Ruck, & Driskill, 1988). Such information is an essential starting point for MPT planning and management, and OA data have been used with great success in DoD MPT planning. However, a complete picture of the current MPT system in an occupation requires many additional kinds of information. Such additional requirements include, for example, information concerning the people in an occupation (e.g., aptitudes, physical characteristics, previous training and work experience, and personal preferences).

Much of these data can be obtained from existing sources. Within the Air Force, the Occupational Research Data Bank (Longmire & Short, 1989) is a single repository for both task- and

person-oriented data in an occupation. In MPT planning, we are generally concerned with changes to the *status quo* in an occupation. These changes may reflect possible interventions to improve the MPT functioning of an organization. They may also reflect changes driven by external considerations such as demographic, force structure, budget, policy, or work process changes. As an example of the latter, the Air Force is currently implementing a two-level maintenance approach for some equipment items (Vaughan, Grimes, & Knight, 1993). Under this policy, off-aircraft maintenance will be done at a centralized depot, rather than at base-level shops. Planners are often concerned with intervention changes in order to respond to externally-imposed changes.

In any case, the focus of such MPT planning is not on the current situation in an occupation *per se*, but on how MPT functioning might change as a result of interventions or externally-imposed changes, as described above. Thus, the data (OA, personnel, etc) describing the current situation must be extrapolated to different situations, including situations that have never existed before. Predictive models can greatly facilitate this extrapolation process. In such a model, key outcome variables (e.g., cost, performance) are expressed as functions of input variables describing a situation or scenario (real or hypothetical). Such a model can then be used to simulate the occupation in order to predict outcome variables under various changes that may be of interest.

Ward, Mitchell, Weissmuller, Vaughan, and Bennett (1993) have described requirements for an MPT management and planning support software system. That system would require and implement a model such as described above for entire individual and organizational MPT system. As Ward, *et al* (1993) point out, such a software system and its underlying model have several significant characteristics. Perhaps the most notable of these is that the model relates variables operating or measured at multiple levels of abstraction. Some variables (e.g., aptitudes, preferences) operate at the level of individual people. Other variables operate at broader levels. For example, task characteristics are generally independent of specific workers and apply across groups of workers. In particular, key outcome variables are usually related to overall organizational effectiveness.

As may be seen, a key feature of a unified theory of work is that such a theory relate variables operating at the level of individual people and at possibly multiple organizational levels.

### A Unified Theory of Work Schema

In order to meet the requirements outlined above, a unified theory of work should have several key characteristics. First, it should account for an individual person's performance on a specified task. This will involve both task and people characteristics. It will also involve those human resources activities that lead to task performance, principally training. Secondly, a unified theory of work should account for organizational performance. This will involve relating variables operating at multiple levels of abstraction, including individual task performance, for many people and tasks, and a variety of work group and organizational variables. Finally, these two submodels -- the individual-task performance model and the organization performance model -- should be interrelated.

A unified theory of work should incorporate direct impacts of task and people characteristics on organizational variables. Such a theory should also reflect impacts of organizational variables, such as climate and personnel policies, on individual task performance. The two submodels should be completely separable.

Figure 1 presents a schema for a unified theory of work which meets these requirements. This is in no way a completely-specified theory. It is not even a complete catalogue of variables that should be included in a theory. It does, however, indicate the major kinds of variables to include, as well as the major relationships that should be reflected in the theory.

Figure 1 illustrates impacts of various kinds of task characteristics and individual difference variables on individual task performance, as well as the selection and training processes that precede such task performance. These variables are likely to impact on work group performance as well; this feature is also included.

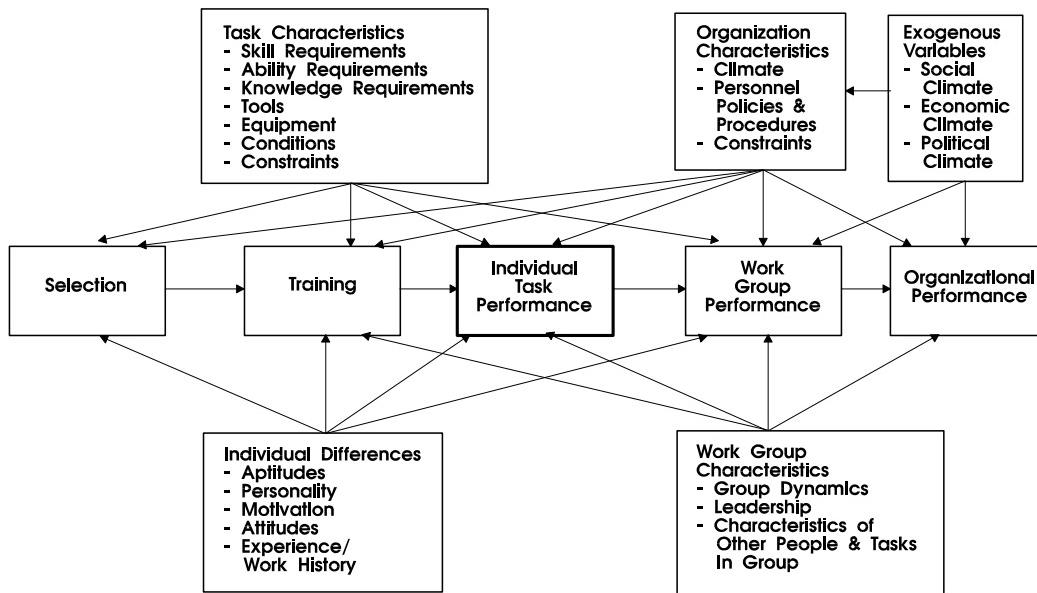


Figure 1. Schema for a Unified Theory of Work.

As mentioned above, Figure 1 only illustrates a schema for a unified theory of work, not a fully-elaborated theory. How might this schema be elaborated? Mitchell and Driskill (1986) have developed a model relating training to task performance. This model is illustrated in Figure 2 (from Mitchell & Driskill, 1986, Figure 5). This model has several significant features.

First, it reflects the training development, delivery, and evaluation process, and thus reflects variables related to the effectiveness of that process in producing good task performance.

Secondly, the model includes many of the relevant exogenous variables. These include, for example, organizational factors, situational constraints, and stressful life events.

Thirdly, that model includes measurement submodels for important variables, such as task performance measurement. These are all elaborations that a unified theory of work should have.

On the other hand, the Mitchell and Driskill (1986) model is not well-elaborated with respect to individual differences or organizational outcomes.

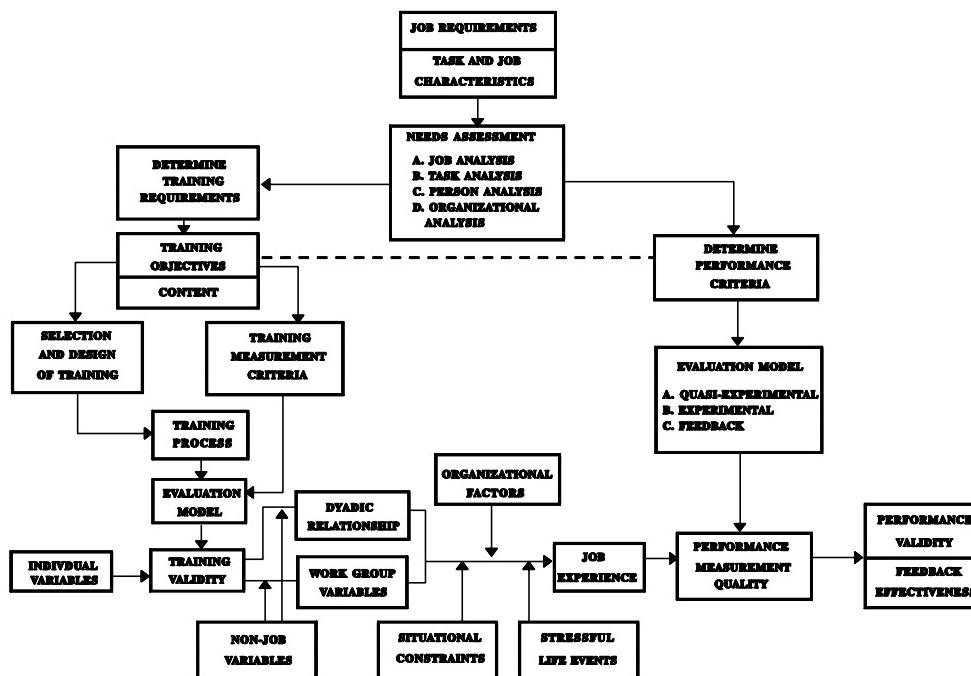


Figure 2. Training and Performance Validity Model (Mitchell & Driskill, 1986).

## Research and Development Needs

In order to further elaborate and test a unified theory of work, a number of R&D needs must be met. A unified theory of work required a comprehensive taxonomy of task and human individual difference variables. This will involve separate taxonomies of task characteristics and individual

differences, with clear connections between variables in the task and individual differences taxonomies. A great deal of R&D has already been done concerning taxonomies in these two areas (Fleishman & Quaintance, 1984). However, for the most part, researchers have focused primarily on one of the areas (people or tasks), with relatively little emphasis on the other area. As a result, people and task variable taxonomies have not been well-connected. A unified theory of work requires task and individual differences taxonomies with clear relationships.

A second major research issue that will need to be addressed to develop a unified theory of work concerns modeling at multiple organizational levels. Bennett, Ruck, and Huffcutt (1992) have discussed approaches for addressing this issue. Figure 3 (Bennett, Ruck, & Huffcutt, 1992) illustrates a simple organization and identifies some of the linkages and dynamics that may serve as moderator variables across levels. The fundamental problem is that empirical relationships among variables at different levels tend to be weak. As a result, it is difficult to relate lower-level variables (e.g., individual task performance) to organizational outcomes of interest. Yet, for a unified theory of work to be useful for MPT planning and management, such a theory needs to make visible the organizational impacts of various MPT interventions. One approach to solving this problem involves including the important moderating variables operating at each organizational level in the theory. This is illustrated in our schema by including sociopolitical variables that are exogenous to an organization, but can greatly impact on organizational performance.

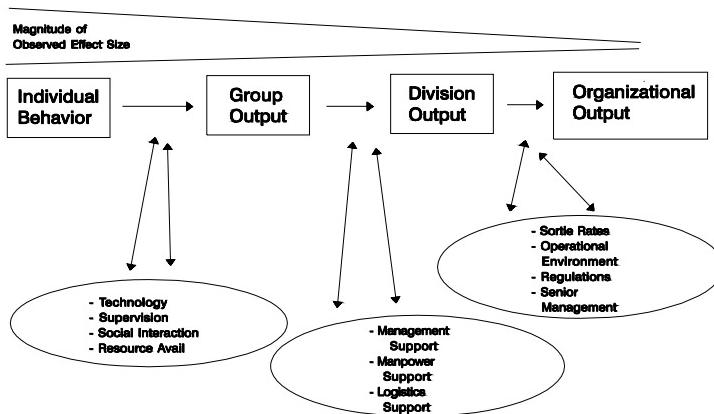


Figure 3. Simple Organizational Structure (Bennett, et al., 1992).

## Conclusions

In summary, we believe that a unified theory of work is needed. Such a theory will provide a needed framework for an integrated MPT planning and management system -- an "ultimate person-job matching system". Such a theory will also serve to increase synergy and focus in applied MPT R&D, as well. Such a theory will provide the means to systematically extrapolate OA data and other data describing the current situation to new and different circumstances of interest to MPT planners.

We have presented a general schema for a unified theory of work (see Figure 1), and discussed some ways in which that schema needs to be elaborated.

As may be seen, however, a great deal of work is required to take that schema into a useful theory. This work will involve taking the best theories from each area spanned by a unified theory of work and stitching these submodels into an integrated whole. A number of R&D issues will need to be addressed to do this. We encourage our readers to take the next steps to develop a unified theory of work that will lead to truly integrated MPT management.

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